

NON-PUBLIC?: N

ACCESSION #: 9304260194

LICENSEE EVENT REPORT (LER)

FACILITY NAME: Haddam Neck PAGE: 1 OF 04

DOCKET NUMBER: 05000213

TITLE: Control Rod 31 and 32 Malfunction

EVENT DATE: 03/23/93 LER #: 93-002-00 REPORT DATE: 04/20/93

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10
CFR SECTION:

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: David V. Moore, Engineering TELEPHONE: (203) 267-2556
Technician

COMPONENT FAILURE DESCRIPTION:

CAUSE: SYSTEM: COMPONENT: MANUFACTURER:

REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On March 23, 1993, at 0844 hours, with the plant at 100 percent power, operators attempted to insert control Bank B. When rods were inserted one step, control rods 31 and 32 from Bank B dropped approximately 50 steps. A decision was made to recover the misaligned rods. Rods 31 and 32 were placed in disconnect to prevent further insertion. When the remaining rods in Bank B were inserted one step, control rods 31 and 32 dropped approximately another 100 steps. Immediate operator action was to initiate a manual trip of the reactor. Subsequent investigation revealed that a faulty contactor allowed the control rods to drop during a demand for rod insertion. The root cause was inadequate procedural verification on the maintenance of control rod contactors. Corrective action will be implemented through procedural enhancement. This event is reportable under 10CFR50.73 (a)(2)(iv) since it resulted in manual actuation of the Reactor Protection System.

END OF ABSTRACT

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BACKGROUND INFORMATION

The rod control system at Haddam Neck, (EIS Code: AA) controls the direction and speed of the control rod motion. The system enables groups or banks of control rods to be moved as well as individual control rods. To move individual control rod banks, the Bank Selector Switch is switched to select a particular bank. If a shutdown or control bank is selected, the Selection Circuit connects the selected bank to its associated slave cyclers contacts. The slave cycler contacts cycle the Lift, Stationary Gripper, and Movable Gripper coils, to allow rod motion

in either direction. The sequence for rod insertion is as follows: Movable Gripper coil energized to full power, Stationary Gripper coil energized (transfers load to stationary gripper), Movable Gripper coil de-energized (movable gripper disengages), Lift coil energized (movable gripper lifts 3/8 inch, one step), Movable Gripper coil energized (movable gripper engages), Stationary Gripper coil de-energized (transfer of load to movable gripper), Lift coil de-energized (rod drops 3/8 inch, one step), Movable Gripper coil energized to half power (coil life extension). To ensure that rod position is maintained during movement, the Stationary Gripper coil contactor needs to function.

All rods out is defined as, all control rods retracted to 326 steps.

EVENT DESCRIPTION

On March 23, 1993, at 0844 hours, with the plant at 100 percent power, operators attempted to insert control rod Bank B, which was indicating 264 steps. The reactor operator inserted Bank B one step. The following alarms were received: Rod out of step, NIS channel deviation, Individual Rod Position Indication - Group Rod Position Indication. Operators observed that rods 31 and 32 were indicating approximately 224 and 220 steps respectively. At 0915 hours, a decision was made to reduce reactor power and recover rods 31 and 32. The rod disconnect switches were enabled for rods 31 and 32, and the gains on the Nuclear Instrumentation System (NIS) power range channels 3 and 4 were adjusted to enable monitoring for further rod slippage. At 0916:57 hours, Bank B was inserted one step. Operators observed an NIS deviation alarm, and rods 31 and 32 were indicating approximately 107 and 110 steps respectively. At 0917:24 hours, in accordance with the requirements of Abnormal Operating Procedure AOP 3.2-23, "Malfunction of Rod Control System," the

reactor and turbine were manually tripped and Emergency Response Procedure (ERP) E-0, "Reactor Trip or Safety Injection" was performed. Shortly after the reactor and turbine trip, high pressure steam dump actuation was observed with Tavg decreasing approximately 10 degrees below

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the no load Tref of 535 degrees. A steam dump isolation was performed. The reactor was stabilized in Mode 3. All other plant systems responded normally to the reactor and turbine trip.

CAUSE OF THE EVENT

The root cause of this event was attributed to inadequate procedural verification on the maintenance of rod control contactors. Preventive Maintenance Procedure (PMP) 9.5-2, "Rod Control System Preventive Maintenance" requires maintenance to be performed once each refueling. This procedure includes all contactors in the rod control system. The contactor contacts are cleaned and contactors are inspected for wear. To clean the contacts, partial disassembly of the contactor is required. There is no formal step in the procedure to verify that mechanical fasteners are tight upon reassembly. Although it cannot be verified, it is believed that the mechanical fasteners on the Stationary Gripper coil contactor for control rods 31 and 32 became loose due to inadequate tightening. This loose condition provided a contact misalignment within the contactor. This misalignment became increasingly pronounced with continued use. At the time of the event, this misalignment did not allow the contacts on the Stationary Gripper coil contactor to "make", which de-energized the Stationary Gripper coil allowing control rods 31 and 32

to drop during rod movement.

SAFETY ASSESSMENT

This event is reportable under 10CFR50.73(a)(2)(iv) since it resulted in manual actuation of the Reactor Protection System. When Bank B Rods 31 and 32 indicated approximately 224 and 220 steps withdrawn, respectively, with the initial Bank B indication of 264 steps, Technical Specification Action Statement 3.1.3.1.d was entered. This Action Statement requires the plant to be in hot standby within 6 hours if more than one rod is misaligned by 24 steps.

With Bank B rods 31 and 32 misaligned by approximately 45 steps, the negative reactivity insertion was bounded by that used in the Dropped Rod Cluster Control Assembly Analysis contained within Section 15.2.6 of the Updated Final Safety Analysis Report (UFSAR). This was observed due to the small magnitude of the RCS temperature drop, about 0.5 degrees F, and the turbine load decrease of about 5 MWe. The small reactivity insertion from rods 31 and 32 being misaligned was not unexpected due to the peripheral location of these two rods. Based upon these observations, the decision to disconnect rods 31 and 32 and attempt to realign them with Bank B while reducing load did not pose any safety issues.

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When Bank B was inserted to recover rods 31 and 32, these two rods subsequently dropped approximately an additional 120 steps. At this point in the event, these rods were considered dropped (i.e., fully inserted) and thus in an unanalyzed condition of the UFSAR (i.e., 2 dropped control rods). In accordance with Abnormal Operating Procedure

AOP 3.2-23, "Malfunction of the Rod Control System", immediate actuation of the Manual Reactor and Turbine Trip at this point was the correct action.

All other control rods remained operable and trippable throughout the event. Even though rods 31 and 32 were below the rod insertion limit at full power, Technical Specification Action Statements 3.1.3.6.1.a and 4.1.1.1.1.a were met.

There is no safety significance to this event.

CORRECTIVE ACTION

Short term corrective action was to tighten the mechanical fasteners on the Stationary Gripper coil contactor for rods 31 and 32. The testing of the contactor was successfully completed. The mechanical fasteners on the remaining coil contactors were inspected and verified.

Long term corrective action will be to replace the lock washer for each mechanical fastener on all applicable coil contactors in the rod control system during the Cycle 17 refueling outage and to revise PMP 9.5-2, "Rod Control System Preventive Maintenance," to incorporate the verification of the tightness of mechanical fasteners.

ADDITIONAL INFORMATION

None

PREVIOUS SIMILAR EVENTS

None

ATTACHMENT 1 TO 9304260194

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CONNECTICUT YANKEE ATOMIC POWER COMPANY

HADDAM NECK PLANT

362 INJUN HOLLOW ROAD o EAST HAMPTON, CT 06424-3099

April 20, 1993

Re: 10CFR50.73(a)(2)(iv)

U. S. Nuclear Regulatory Commission

Document Control Desk

Washington, D. C. 20555

Reference: Facility Operating License No. DPR-61

Docket No. 50-213

Reportable Occurrence LER 50-213/93-002-00

Gentlemen:

This letter forwards the Licensee Event Report 93-002-00, required to be submitted, pursuant to the requirements of the Haddam Neck Plant's Technical Specifications.

Very truly yours,

John P. Stetz

Vice President

JPS/dl

Attachment: LER 50-213/93-002-00

cc: Mr. Thomas T. Martin
Regional Administrator, Region I
475 Allendale Road
King of Prussia, PA 19406

William Raymond
Sr. Resident Inspector
Haddam Neck

1028-3 REV. 2-91

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